STAN-EVAL NOTES
CIVIL AIR PATROL VIRGINIA WING
UNITED STATES AIR FORCE AUXILIARY
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VOR Checks are Important: We've all had the experience of getting to the aircraft for an IFR flight and finding the VOR check is out of date. Recall CFR Part 91.171 which specifies that a VOR check must be done within 30 days if the VOR is to be used (this includes ILS approaches). If it hasn't been done, you can't legally use the VOR as a primary instrument in IFR flight. This could cause untold grief if a mission is underway with IFR conditions and now the aircraft is not airworthy for IFR flight. Ensuring VOR checks are current is an item on the Form 71 (aircraft inspection form). There is no reason why any CAP aircraft should not have a current VOR check recorded unless it's been out of service for more than 30 days. We need to make it a habit to always do a VOR check on any flight. Even if it's weeks away from the next required check, it keeps our planes current, its good practice, and it keeps us mission ready. Just do it.

Doing VOR checks correctly (L. Randall, from the August 2011 Stan Eval): We all do the required 30 day VOR checks, right? Or we check the aircraft logs to make sure that it has been done. Wrong! Most of the CAP planes that I get into have not had a recent VOR check, and the ones that do are not logged correctly. Suppose you are in cruise and decide to tune both VORs into a station and look at the differences. You note that they are within 2 degrees of each other and determine the error is acceptable. So you log it as an airborne check with a two degree error. Is it really an airborne check? NO! It is a dual/differential check. To be an airborne check requires that you be over a published airborne check point. Most of us are not lucky enough to be at an airport with a VOT so we rely on other means of checking our systems. Remember, even though you are flying VFR, the next flight might be IFR and require the necessary check. Everyone should review the regulations to make sure that they are doing the correct entry. Each flight you should review the aircraft logs and if the check is not done then do it. Not that hard and worth the effort. Kind of like checking the tire pressure before each flight. We need to do a better job of that as well!

A World without GPS (from the April 2011 Stan Eval Notes): It is not unusual for there to be localized outages or degradations to GPS. The events of 9/11 and the recent events in Japan demonstrate how bad things can get due to terrorist attacks or Mother Nature. It is possible that in a national emergency, there could be a loss of GPS for extended periods. The USAF could decide for security reasons to suspend GPS service. For these and many other reasons, we cannot rely on GPS. It's great when we have it but we may not always have it. As CAP, we must be ready to operate without GPS efficiently and effectively. All CAP pilots should practice basic navigational skills and be ready to operate without GPS (or any navaids). It would be more than embarrassing if when our nation needs us the most, we fail to operate effectively because we grew too dependent on GPS or navaids.

Take a Moment for Inertia: Moments of inertia are an important factor to consider when designing and flying aircraft. The term inertia refers to matter resisting a change in acceleration. A body at rest resists motion while a body in motion will continue that motion unless an external force is applied (Newton's First Law). Obviously, any aircraft has inertia. Moment of inertia is a measure of an object's resistance to changes to its rotation. Numerically, a moment of inertia is simply the weight of a mass multiplied by the distance from some point. The moment of inertia of an object about a given axis describes how difficult it is to change its angular motion about that axis. It includes not just how much mass the object has overall, but how far each bit of mass is from the axis. The further out the object's mass is, the more rotational inertia the object has, and the more torque is required to change its rotation rate.

The moment of inertia of an object can change if we redistribute the weight around the rotation axis. Figure skaters who begin a spin with arms outstretched provide a striking example. By pulling in their arms, they reduce their moment of inertia, causing them to spin faster (by the conservation of angular momentum). Consider our Cessna and GA8 aircraft which have fuel tanks in both wings. When you bank the aircraft, the aerodynamic forces created by the ailerons must overcome the moment of inertia caused by the weight of the wings (they have to overcome aerodynamic forces as well). You could theoretically improve your roll rate by either reducing the gas in the wing tanks or moving the gas closer to the fuselage. Reducing the fuel load reduces the needed force and banking is easier. Aerobatic aircraft optimally have the gas tank within the fuselage to make it easier to roll the aircraft. Or if that is not possible, the wing tanks will be mounted as close to the fuselage as possible. Large moments of inertia are not necessarily bad. Lots of fuel in the wings can help keep an airplane laterally stable in turbulence.

CAP's Maule aircraft have two tanks in each wing, one inboard and one out board. By keeping the outboard thanks full, you have a larger moment of inertia and the Maule is more stable in the lateral axis. Pumping the gas inboard increases lateral maneuverability (roll rate).

Moments of inertia is one reason why pilots have come to grief trying to do a roll in twin engine aircraft. The lateral moments in a twin are huge because of the engines on the wings (big weights a long way from the fuselage). Nature puts a huge resistance to rolling a twin because of this (along with the aerodynamics). Although some air show pilots will roll a twin, it takes a lot of preplanning, skill, altitude, and time. But the laws of physics can't be broken and if you see an air show pilot rolling a twin, you'll also notice it's never a quick roll. Unless you are an air show pilot, rolling a twin is a really really bad idea.

CAP pilots calculate moments of inertia when computing weight and balance. These moments are measured from some point on the airplane (often the firewall). The moments are the linear distance (usually in inches) along the fuselage (the longitudinal axis) from this point. The moment of the empty aircraft is given by the official weight and balance sheet. The moments of the pilot, gas, baggage and so forth are all obtained by taking the weight (usually in pounds) and multiplying it by the appropriate distance. So if the pilot sits 36 inches from the firewall (given the firewall is the point of reference), then the longitudinal moment of inertia generated by a 180 lb pilot is 36 X 180 = 6480 inch pounds. Totaling the moments and dividing by the total weight gives the center of gravity referenced to the firewall (or whatever the reference point was).

Tip of the Week: There are no free lunches but we can get a free tip of the week courtesy of Pilot Workshops. You can go to this link and sign up for the weekly tips. Some of these are pretty good.

http://pilotworkshop.com/tips.htm

Let's get started (R. DeHaan, Aviation Adventures): Spring is here with great flying weather for all of us. No more bitter cold preflights and no more waiting for the frost to melt. If you are one of the brave winter flyers you will certainly enjoy the adjusted procedures in preparation of your flight. However there could be an important change before you get the engine started. More people will be flying and often you arrive at the airport right after the aircraft has returned from an earlier flight. This most likely will require a different approach to get the engine running. Especially the fuel injected aircraft need a little more attention during a possible "hot" start.

Let's begin with a normal procedure during fuel injected "cold" or normal start procedures. The checklist calls for "priming" by turning the fuel pump on, mixture forward for several seconds and confirm on the fuel flow gauge for a needle deflection or change in indication, which confirms you ACTUALLY are priming, versus just moving levers. Make sure to return the mixture to idle/cut off after a few seconds. During the start sequence the mixture comes forward as soon as the engine "catches", allowing for a continued fuel flow into the cylinders keeping the engine running.

Now you arrive at the plane and the oil temperature gauge shows temps in the green. The engine also felt warm during the preflight. Yep, that calls for a "hot" start procedure. The checklist will call for skipping the "priming steps." There is no need to put more fuel in those cylinders. In fact, priming a hot engine could cause a fire hazard. It should start just fine by turning the key and moving the mixture forward, once the engine "catches." If it does not start, feel free to put a little prime in the cylinders, and continue with a regular start. However prime a hot engine sparingly; otherwise you might flood the engine.

So now you realize that you did not apply the hot start procedures and you most likely flooded the engine! You may smell raw fuel and if you step out of the airplane, you may be shocked to see fuel dripping from the cowling. Not good! As per the checklist you should keep the mixture in the idle/cutoff position and the throttle at least halfway open. This will allow a lot of air to mix with the lots of fuel that is already in the cylinders, without adding more fuel to it (mixture is still idle/cut off). It may take a few more rotations than usual for the engine to catch, since all the fuel and air need to reach the perfect ratio before it reaches combustion. Since the throttle is much further forward than during a regular start, be ready to retard the throttle back to approximately 1000RPM, followed immediately by moving the mixture slowly towards rich to keep the engine running.

Some recommendations: How about using the check list? It might keep you from damaging yourself, your Passengers, or the aircraft. Oh and by the way, it is just very good practice as well as required by CAPR 60-1. The pro's do it for a good reason. Secondly, use common sense (applicable to your situation in the aircraft for that day). Common sense for completing household chores does not necessarily apply in the plane. Thirdly, if you are not sure what to do, consult an instructor (how did you pass your F5 and not know how to do a hot start?). A lot of people develop "great hands on procedures" that worked for them in the past. Still it does not necessarily make it right. Follow the checklist unless there is a good reason to deviate from it. Finally the starter has limitations. Most aircraft have starters that can only be engaged for 10 seconds per attempt. It also will need a cool down BEFORE the next attempt is made. Check with the placard or the guidance in the POH. It is easy to overheat the starters, especially in the summer.

Helo versus Fixed Wing Time: We've had an interesting question come up from time to time from some of our pilots who have a lot of time in helicopters. Can that time be counted when trying to qualify as a Cadet Orientation Pilot or a Mission Pilot (or any other rating in CAP)? CAPR 60-1 doesn't really specify but has generally been interpreted as only allowing fixed wing time only. So the answer is no in general. However, there is some leeway here. If you are a helo pilot who also has a fixed wing rating (and fixed wing time) you may be able to apply your helo time but it will take a waiver from NHQ. If you wish to submit a waiver, contact the Wing Standardization Evaluation Officer.

Cadet Orientation Rides and Pilots: Special care must be exercised by pilots conducting cadet O rides. These cannot be conducted like any other CAP flight but must adhere to higher standards and consider special concerns associated with orientation flights. Cadet Orientation Pilots must fly these flights in accordance with either CAPP 52-7 (for CAP Cadets) or the Memorandum of Agreement with the Air Force (for AFROTC cadets). The requirements are very different and vary depending on which flight is being performed. Pilots are strongly urged to review these requirements before any orientation flight. Pilots should be sensitive to turbulence and other factors that may not be a "no fly" item but would risk an air sick cadet or other situation that might give the cadet a bad impression of flight. This includes not flying in what might be acceptable VFR but conditions that make either the Cadet or their parents question our WX judgment. Most of the objectives of each flight can be accomplished in less than the normal hour of hobbs time. Ensure that this flight time does not include any maneuvers or situations that would be outside the guidelines of CAPP 52-7 or the Air Force Memorandum. This is especially important when flying a cadet who has significant flight experience (the parents are pilots or the cadet is a student pilot) where the orientation pilot may think its ok to go outside the syllabus. It's not and don't do it.

Update to the VAWG Glider Program: The Blanick L23 glider (N366BA, CPF4533) is now operational. The C182 tow plane (N5383N, CPF4534) is still undergoing repair. However, we hope to kick off the glider season

using a C172 initially as a tow plane. Be sure to let Capt Pat Riley or Capt Larry Randall know if you are a glider Air Boss, a glider pilot, a CFIG, or a qualified tow pilot.

Mountain Flying Clinic 14-15 April: This class is now closed. The lucky attendees should have received their notification that they are now registered.

Instructor Pilot Clinic and Form 5 Clinic: The date of the instructor pilot clinic at FCI has moved to Saturday 23 June. This clinic is open to any active VAWG Instructor pilot, check pilot, or pilot examiner. If you are not currently any of these but want to be, you may attend the course space permitting. Please send an email to steve.hertz@ngc.com if you are interested in attending.

We are also planning to host a Form 5 clinic in DAN on 7 July.

Articles for the VAWG Stan Eval Newsletter: We are always looking for brief articles of interest to VAWG pilots to include in this newsletter. CAP has many very experienced pilots and aircrew who have useful techniques, experiences, and tips to share. Please send your contribution to steve.hertz@ngc.com. If your article is accepted, you will get a pro rata share of the VAWG Stan Eval Newsletter subscription fees.